



ADVANCE QUEENSLAND TRUSTED AUTONOMOUS SYSTEMS DCRC (AQ TAS DCRC) FELLOWSHIP GUIDELINES

The AQ TAS DCRC Fellowships are supported by funding from the Queensland Government

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INTRODUCTION	3
About the TRUSTED AUTONOMOUS SYSTEMS DEFENCE CRC	3
The Advance Queensland Trusted Autonomous Systems DCRC Fellowship	3
Benefits	4
Relationship to Advance Queensland Fellowships	4
Focus Areas	4
Eligibility Criteria	6
The applicant organisation	6
The proposed Fellow	6
Matched cash funding	7
The fellowship project	7
Intellectual property	8
TAS DCRC & industry partner	8
Other partners	8
Other conditions	9
Using the fellowship funds	9
OTHER CONSIDERATIONS	10
Reporting Requirements	10
Assessment criteria	12
Assessment process	13
Fellowship Agreement	13
Privacy	14
How to apply	14

INTRODUCTION

ABOUT THE TRUSTED AUTONOMOUS SYSTEMS DEFENCE CRC

The Trusted Autonomous Systems Defence CRC (TAS DCRC) has been established to research, develop and deliver world-leading trusted autonomous Defence technology; build new and innovative IP through focused research and technology programs, while assisting Australian industry in developing new, improved and competitive autonomous technologies; evaluate the utility of autonomous systems to Defence through capability demonstrations; transform the capacity and ability of Defence to acquire, deploy and sustain leading-edge autonomous and robotic technologies; and improve the competitiveness, productivity and sustainability of Australian industry.

TAS DCRC achieves this by fostering collaboration between Defence, industry and research organisations. TAS DCRC is Headquartered in Queensland as part of the Queensland State Government's desire to foster innovation and create growth and opportunities across the State. TAS DCRC is working on a range of initiatives to support the State Government's ambitious objectives.

THE ADVANCE QUEENSLAND TRUSTED AUTONOMOUS SYSTEMS DCRC FELLOWSHIP

The Advance Queensland Trusted Autonomous Systems DCRC (AQ TAS DCRC) Fellowship program is an opportunity developed by TAS DCRC in partnership with the Queensland State Government. The program provides individuals employed by a Queensland based publicly funded research organisation and their partners access to matched funds of up to \$300,000 to support a 3-year research fellow in key focus areas important to future development and exploitation of autonomy.

This joint initiative will build Queensland's reputation and capacity to conduct innovative research and development, deliver new products and services for Queenslanders, establish new industries that will provide jobs for the future, attract and keep talented researchers in Queensland, and develop sovereign capability for the Defence industry.

The Fellowship program supports researchers undertaking original work that will have a positive impact on Queensland. The following AQ TAS DCRC Fellowship grants are available:

- early-career fellowships - \$180,000 over three years (excluding GST)
- mid-career fellowships - \$300,000 over three years (excluding GST)

The program is managed by TAS DCRC and Fellowship funding is paid to the applicant organisation (the Fellow's employer).

This document outlines the call for applications from interested organisations.

BENEFITS

The AQ TAS DCRC Fellowships program:

- provides opportunities for researchers to pursue and continue their research careers
- assists in retaining the State's best and brightest research minds in Queensland
- attracts talented researchers from interstate and overseas
- supports increased linkage and closer collaboration with industry organisations to foster the translation of research into practice
- delivers tangible benefits and practical outcomes for Queensland by supporting applied research and development

RELATIONSHIP TO ADVANCE QUEENSLAND FELLOWSHIPS

This program is inspired by the current Advance Queensland Fellowship program but operates independently. In the AQ TAS DCRC Fellowship, TAS DCRC is the funding body. Applications are submitted directly to TAS DCRC, not through the Advance Queensland application process.

FOCUS AREAS

Advances in autonomous systems will provide Defence with the ability to achieve tactical and strategic advantage in high tempo, contested, congested and highly lethal military operational environments. Autonomous platforms capable of making reasoned decisions about goals and context will be able to operate where risks to humans are high, but will also provide a significant force multiplier if they are produced at relatively low cost and if they are capable of working collaborative or cooperatively alongside each other and human teammates.

TAS DCRC is focussed on addressing key challenges in four areas of Trusted Autonomy-specific research as part of its common good program. These four areas are:

Co-operative Robotics

TAS DCRC is calling for proposals to undertake novel research into algorithms that facilitate robust, agile and flexible collaboration and/or cooperation between robots (and software agents) within dynamic operational environments across air, land and sea. TAS DCRC is particularly interested in work that deals with one or more of the following problems in this domain:

- multi-agent and distributed learning, including evolutionary learning within agent/robot populations and distributed adaptive inferencing/reasoning
- distributed and decentralised planning, including but not limited to: biomimetic and bio-inspired approaches to multi-vehicle control; efficient, low-cost task allocation across heterogeneous systems; other approaches producing tractable outcomes in decentralised systems
- distributed active perception with heterogeneous systems
- theories of mind

- non-language-based communicative protocols
- language

Bi-directional cognitive state awareness

Human operators can interact in several ways with autonomous systems, whether they be embodied (e.g. UAVs) or disembodied (e.g. autonomous agents providing plans or decision support). In theory, the introduction of autonomy will lead to reduced workload and improved situation awareness, but only if it is done in a way that leverages the capabilities of human perception and cognition. In human-autonomy teams as in human-human teams, team members will require a certain amount of shared understanding. Currently, we use sensors to provide situational appreciation to the human operator, but neither the situation nor the operator's appreciation of it is understood by the system that conveys it. Areas of interest include:

- human factor challenges associated with manned-unmanned teaming (manned vehicles operating in a team with autonomous vehicles), such as how to provide command intent to the autonomous vehicles, how to display/interpret the information they receive from the autonomous vehicles, etc.
- human interaction with autonomous agents (planning systems, command and control, etc.), including issues of trust and agent transparency ("explainable AI")
- sense-making by autonomous agents grounded in semantic reasoning over contexts and represented knowledge (i.e. going beyond machine learning) that can be shared with humans

Assurance of AI and Autonomous Systems

AI is introducing new challenges for regulators, insurers, and technology developers, with current methods, policies and practices lagging behind technical advances. New approaches to assuring AI and autonomous systems that are sustainable and effective in the context of rapid advances in the underlying technology of autonomy are required. What techniques, frameworks, protocols and environments are needed to assure autonomous systems? How can they be scaled to meet the requirements of diverse technologies and contexts of use? How do we construct assurance apparatus to gain a social license to operate? Areas of interest include:

- Theories, models, protocols, prototypes and technologies to build robust and comprehensive testing frameworks and facilities for AI and autonomous systems for simulated and real-world environments such as live-virtual simulation, digital twins, augmented and virtual reality.
- New and evolving regulatory models, e.g. value-sensitive design, smart regulation, adaptive regulation, outcome-based regulation, formal models, risk-weighted regulation, or collaborative regulation with existing regulatory structures, e.g. Specific Operations Risk Assessment (SORA), International Regulations for Preventing Collisions at Sea 1972 (COLREGS).
- New theoretical models and scientific techniques for measuring and managing bias in data and algorithms, enhancing resilience of autonomous systems to adversarial attack, and ensuring data and algorithm integrity and provenance.

Embodied Artificial General Intelligence

Trusted Autonomous Systems based on embodiment of Artificial General Intelligence approaches, to include the following:

- continuous learning through “life”
- self-maintenance and robustness
- survivability and adaptation to surprise
- human-like learning and reasoning such as model building, schema building, transfer learning, semantic reasoning

ELIGIBILITY CRITERIA

THE APPLICANT ORGANISATION

The applicant organisation must be:

- a Queensland-based higher education provider listed at Table A or Table B of the *Higher Education Support Act 2003* (Cth)
- have an Australian Business Number (ABN) and be registered for GST
- a Participant of TAS DCRC pursuant to an agreement in TAS DCRC’s standard form, and remain a Participant for the duration of the Fellowship

Other organisations may submit jointly with the above. Joint application with an industry partner is encouraged (who is also expected to have an ABN), and where successful, the industry partner must also be a Participant of TAS DCRC and remain a Participant for the duration of the Fellowship.

THE PROPOSED FELLOW

The proposed Fellow will preferably be an Australian citizen and be eligible to hold a Baseline security clearance. Applications from non-citizens will only be accepted under exceptional circumstances and at the discretion of the assessment panel.

Applications nominating Aboriginal and/or Torres Strait Islander researchers are encouraged.

The Fellow must, as of the closing date for applications, hold a PhD research qualification or have submitted such. In the case of the latter, the Fellowship cannot commence until the PhD has been approved.

Depending upon the proposed Fellow’s experience, the following Fellowships are available:

- up to 5 years post-PhD research experience for early-career fellowships
- 5 to 10 years post-PhD research experience for mid-career fellowships

Researchers with 0-5 years post-doctoral research experience will not normally be considered for mid-career Fellowships unless they have substantial, relevant pre-doctoral research experience - excluding PhD studies.

Allowances will be made for time taken away from research when determining the number of post-doctoral research years. For example, time away from research for parenting, caring, illness, or time in non-research roles will be considered as gaps in research. Proposed Fellows cannot claim standard recreation leave, sick leave or long service leave as a research gap.

The Fellow must be employed by the applicant organisation in a minimum 50 per cent Full Time Equivalent (FTE) capacity.

The Fellow must spend a minimum 50 per cent FTE on the Fellowship. The Fellowship funding is the same (full amount) for both full-time and part-time Fellows. Part-time Fellows may decide to use the funding to engage more technical and research support to enable the Fellowship Project to be completed in three years.

The proposed Fellow must have not previously received a Queensland Government fellowship of the same or higher level.

AQ TAS DCRC Fellows must not concurrently hold another fellowship.

MATCHED CASH FUNDING

The Fellowship Project must have combined cash funding from the applicant organisation and/or partner organisation(s) that equals or exceeds the AQ TAS DCRC Fellowship funding being sought.

Cash contributions may be a combination of:

- funding directly contributed to the Fellowship by the applicant organisation and/or the partner organisation(s)
- “salaries as cash”. This includes the standard salary remuneration and salary on-costs of the Fellow and other dedicated Fellowship research/technical staff. Salaries as cash can be claimed for the FTE time that staff spend on the Fellowship Project for applicant and partner organisation staff. The non-Fellowship time of these staff cannot be claimed as a cash contribution

Queensland Government non-grant funding may be used as co-funded (matched) cash, but cannot exceed \$90,000 (excluding GST) for early career Fellowships, or \$150,000 (excluding GST) for mid-career Fellowships from all sources (applicant organisation and/or all partner funding).

Queensland Government grant funding cannot be used as co-funded (matched) cash.

THE FELLOWSHIP PROJECT

The Project Proposal required to be submitted with the application for an AQ TAS DCRC Fellowship must directly address at least one of the Focus Areas outlined in these Guidelines.

The Fellowship Project must be undertaken in Queensland, and the Fellow must reside in Queensland for the full duration of the Fellowship.

Fellows must complete the Fellowship Project over three continuous years, irrespective of their FTE commitment to the Fellowship (which, as above, must be 50 per cent FTE or higher).

The Fellowship may involve collaboration with other partner organisations that can make significant contributions to the Fellowship Project.

INTELLECTUAL PROPERTY

Subject to the completion of the Fellowship, intellectual property created during the course of the Fellowship (Fellowship IP) will vest in the applicant organisation (or as agreed by the applicant organisation, the Fellow, and any other partners).

If the Fellowship Project is not completed (for any reason), the Fellowship IP will be assigned to TAS DCRC.

TAS DCRC will be granted a non-exclusive, royalty free licence in perpetuity to use Fellowship IP for commercial and non-commercial purposes, including the right to sublicense (allowing for spinoffs or exploitation elsewhere).

Improvements to the Fellowship IP arising after the completion of the Fellowship Project will be owned by the party that creates the improvements.

Where a Fellowship Project relies upon access to background IP of any party, the applicant organisation or Fellow must ensure that it obtains the rights to use that background IP. Details of the background IP and use rights (including limitations on use) must be set out in the Project Proposal.

Terms under which TAS DCRC is granted access to use the background IP must also be negotiated to the extent necessary for TAS DCRC to use the Fellowship IP in accordance with its licence.

TAS DCRC & INDUSTRY PARTNER

TAS DCRC requires that Fellows must spend some of their Fellowship physically co-located at TAS DCRC in Brisbane, as agreed on a Project by Project basis.

The participation of Queensland-based industry/end users in the Fellowship Project is encouraged but not required. Where applicable, Fellows will be expected to spend some of their Fellowship physically co-located at the Queensland-based industry/end user (in addition to the time spent at TAS DCRC).

Where a Queensland-based industry/end user is not part of the initial proposal, TAS DCRC may assist the Fellow and his/her associated applicant organisation in identifying a potential industry/end user to join the Project.

OTHER PARTNERS

The Fellowship may involve collaboration with other partner research organisations that can make significant contributions to the Fellowship Project.

OTHER CONDITIONS

Fellowships must commence after notification of the award, and no later than June 30th, 2020.

The Fellowship is not transferable in cases where the approved Fellow cannot complete the Fellowship.

The applicant organisation must provide to TAS DCRC a financial acquittal statement containing details of:

- the applicant organisation's cash contributions to the Fellowship
- the cash contributions of the partner organisation(s) towards the Fellowship
- the expenditure of the Fellowship Program funding and matched cash funding from the applicant organisation and partner organisation(s)

The Fellow and applicant organisation must acknowledge the AQ TAS DCRC Fellowship funding in all published material, media releases and public statements relating to the Fellowship and Project in the form notified by TAS DCRC.

Prior to the public release of any material in connection with the Fellowship and Project, TAS DCRC reserves the right to review and approve such material for release.

TAS DCRC must be advised of any changes that are likely to impact on the Fellowship, including changes that may impact on eligibility, research milestones, funding or reporting.

Changes to the contact details of the proposed Fellow or applicant organisation must also be notified to TAS DCRC.

USING THE FELLOWSHIP FUNDS

AQ TAS DCRC Fellowship payments will be released to the applicant organisation who will administer the grant funding. The funding may be used for the following costs:

Salary costs

Salary costs, including standard on-costs (leave loading, superannuation contributions, worker's compensation contributions, and payroll tax) for key research staff, including:

- the Fellow. The Fellow's claimed salary must be commensurate with the FTE percentage committed to the Fellowship. A Fellow is not entitled to a full-time salary unless they spend 100 per cent FTE on the Fellowship
- the FTE Fellowship time of other dedicated Fellowship research/technical staff, including post-doctoral research staff

Other costs

Project costs directly related to the Fellowship, including:

- consumables required specifically for the Fellowship Project
- small equipment (up to \$10,000 per item) required specifically for the Fellowship Project
- travel to conduct research for the Fellow and dedicated Fellowship research/technical staff
- contract research for services that cannot be performed by the applicant organisation, but are integral to the Fellowship Project
- conference travel for the Fellow

Only eligible expenditure incurred on or after the commencement of the Fellowship can be claimed.

Ineligible expenditure and cash contributions

Items not eligible for funding, or not to be regarded as matched cash funding, include:

- institutional salary on-costs above standard salary on-costs
- institutional overheads and operational costs, including general facility and accommodation related costs
- costs associated with non-Fellowship projects/programs of the applicant organisation or partner organisations
- the salary costs of non-Fellowship activities for the Fellow or other dedicated Fellowship staff
- the salary costs of the Fellow's supervisor
- scholarships, including PhD scholarships, or other fellowships
- grants or prizes
- costs associated with administrative support staff
- contract research for services that can be performed by the applicant organisation
- travel and accommodation to attend TAS DCRC or a partner's location

OTHER CONSIDERATIONS

REPORTING REQUIREMENTS

Progress Reports are required to be submitted annually to TAS DCRC during the term of the Fellowship, together with a Final Report upon completion of the Fellowship. Progress Briefs are required prior to each quarterly Research Management Committee meeting between TAS DCRC and the Queensland State Government.

All reports must be in the format set out in the Fellowship Agreement.

Project monitoring

TAS DCRC will assess reports and may conduct site visits to confirm details of the reports if necessary. Occasionally, TAS DCRC may need to re-examine claims, seek further information or request an independent audit of claims and payments.

Progress reports

Progress Reports must:

- include details of progress towards completion of agreed Project activities and milestones
- identify the total eligible expenditure incurred for the Project to date, including expenditure of Fellowship funds and applicant organisation/partner funds
- be submitted by the report due date (reports can be submitted ahead of time if appropriate)

Any Project or milestone reporting delays must be discussed with TAS DCRC as soon as the Fellow becomes aware of them.

Final Report

At the completion of the Fellowship, a Final Report must be submitted which must:

- include the agreed evidence as specified in the Fellowship Agreement
- identify the total eligible expenditure incurred for the Project, including expenditure of Fellowship funds and applicant organisation/partner funds
- be submitted by the report due date

Project Briefs

Project Briefs must:

- provide a dot point summary of Fellowship activity over the intervening quarter
- highlight any specific achievements and challenges
- be limited to no more than 250 words or half a page
- be submitted no later than two weeks before the quarterly Research Management Committee meeting between TAS DCRC and the Queensland State Government

Ad-hoc reporting

TAS DCRC may ask the Fellow for ad-hoc reports related to the Project. This may be to provide an update on progress, or any significant delays or difficulties in completing the Project.

ASSESSMENT CRITERIA

Applications will be considered against the assessment criteria below which will have equal weighting in the assessment process.

1. PROJECT RELEVANCE AND MERIT

The application must:

- describe the reasons why the proposed research is important to Queensland
- outline how the proposed research is aligned to a Focus Area
- outline the research plan, which must have scientific merit, and be well planned and achievable

2. MEANINGFUL COLLABORATION

The application must demonstrate:

- meaningful engagement and participation, including physical co-location, with at least one Queensland-based industry/end-user organisation, which may include TAS DCRC
- the involvement of other people and/or organisations that can make significant contributions to the Fellowship Project

Meaningful engagement with industry/end-user partner organisations can involve:

- spending some of the Fellowship physically co-located with one or more Queensland-based industry/end-user partner organisations, including TAS DCRC (**compulsory**)
- cash-contributions from the industry/end-user partner organisation(s)
- access to specialist equipment and supplies owned by the industry/end-user partner organisation(s)
- access to professional or technical expertise in the industry/end-user partner organisation(s)
- access to a mentor in an industry/end-user partner organisation

Note: The letters of support from the applicant and partner organisations will be considered as part of this assessment criterion.

3. CLEAR OUTCOMES AND BENEFITS FOR QUEENSLAND

The application must demonstrate:

- clear, quantified, outcomes/benefits for Queensland within the next five years, with a well-defined path to translate the research findings into outcomes and benefits for creating Defence sovereign industry capability in Queensland
- how the research addresses an industry/end-user need, and the expected benefits for each industry/end-user organisation

- how the success of the research will capture value for Queensland, including through adoption and/or commercialisation

4. TRACK RECORD

The application should demonstrate that the Fellow has the professional, research, project management and industry engagement skills to undertake and complete the proposed Fellowship.

ASSESSMENT PROCESS

Applications will be assessed in a competitive, merit based process against the assessment criteria by a panel(s) appointed to advise TAS DCRC, comprised of members with scientific, research, and/or industry background.

Applicants may be contacted during the assessment process to clarify information provided in the application and/or to request additional information to enable the appropriate consideration of the application.

As an indication only, the assessment process will take approximately 4 weeks from the closing date for applications.

All decisions of TAS DCRC are final. TAS DCRC is not obliged to accept any application for an AQ TAS DCRC Fellowship.

FELLOWSHIP AGREEMENT

Each application must include an AQ TAS DCRC Fellowship Applicant Declaration found at tasdcrc.com.au/fellowships, signed by the applicant organisation and the proposed Fellow providing their agreement to the terms and conditions under which (if successful) the Fellowship will be awarded.

The Fellowship Agreement comprises:

- the AQ TAS DCRC Fellowship Application and any supporting information;
- these AQ TAS DCRC Fellowship Guidelines; and
- the AQ TAS DCRC Fellowship Agreement Terms and Conditions

The applicant organisation and proposed Fellow must review the AQ TAS DCRC Fellowship Agreement Terms and Conditions prior to submitting the application. These terms and conditions are non-negotiable.

If the application is successful, the applicant organisation will enter into a legally binding Fellowship Agreement with Defence CRC TAS Limited (ABN 98 624 711 011), the company that operates TAS DCRC. The applicant organisation automatically signs the Fellowship Agreement by submitting the Applicant Declaration with the application, but the Fellowship Agreement is not binding until the authorised TAS DCRC representative executes the Fellowship Agreement.

Execution on behalf of TAS DCRC occurs after the applications have been assessed and the successful applicants approved. If at any time there is a material change to the application submitted, the applicant organisation must immediately notify TAS DCRC. If a

material change occurs which is not notified to TAS DCRC, then any resulting Fellowship Agreement will be null and void (whether signed by TAS DCRC or not).

The applicant organisation and the nominated Fellow must not enter into any legally binding arrangements with other parties which prevent them from meeting their obligations under the Fellowship Agreement.

PRIVACY

TAS DCRC collects and collates information from the application form to evaluate applications for the Fellowship program. Only authorised TAS DCRC officers and approved grant assessors have access to this information for the purpose of assessing the application for funding. This information may be shared with the Queensland Government for the purposes of supporting the assessment process and reporting.

Applicants should note that broad details of successful proposals, agreed outcomes, progress and the level of funding awarded may be published independently or jointly by TAS DCRC and the Queensland Government.

Some information may be used to promote funded Fellowship Projects.

The Fellow's personal information will not be disclosed to any other third party without their consent, unless required by law.

For audit purposes, TAS DCRC is required to retain the applications and other supplied supporting material.

The provisions of the *Right to Information Act 2009* apply to documents in the possession of the Queensland Government.

HOW TO APPLY

Applications must be submitted on the application form provided with these Guidelines.

Applications are to be submitted by **1:00 pm AEST Friday the 28th of February 2020** to:

fellowships@tasdcrc.com.au.

Letters of support

Letters of support from the applicant and partner organisations should clearly outline:

- their commitment to, and reasons for supporting, the Fellowship Project
- the likely benefits to be gained by participating in the Fellowship
- the annual cash contributions they will make to the Fellowship

Note: The letters of support from the industry/end-user partner organisations should outline the amount of time the Fellow will be physically co-located with them over the course of the Fellowship.